PHYSICS
PRACTICAL

(SECONDARY)
(Academic Sessions 2015-2017 and 2016 – 2018)

SPECIAL INSTRUCTIONS TO THE EXAMINERS

Special instructions for all the experiments which have been for various groups are given below. Examiners are expected to evaluate the candidates strictly in the light of these instructions. There shall be 3 marks for **NOTE BOOK** and 3 marks for **VOVA VOCE.** For note book full credit may be given for reasonable number of experiments recorded and duly signed by science teacher. In viva voce, simple questions should be put very politely so as to encourage the candidate. Distribution of marks in various experiments is given below :

1. **Measure the diameter and area of a solid cylinder with vernier callipers. (Three readings)**

Determining least count.	2
Zero error, zero correction	2
Measuring diameter (3 different places) + mean diameter	4
Determine area of solid cylinder by using formula	4

2. **Length and diameter of a solid cylinder with vernier callipers (Three readings)**

Determine least count	2
Zero error, zero correction	2
Measuring length (3 readings) + mean	3
Measuring diameter (3 readings) + mean	3
Finding volume using formula	2

3. **Thickness of metal strip or a wire by using a screw gauge (Three readings)**

Determine least count	2
Zero error, zero correction	2
Measuring thickness (3 different places)	4
Taking mean thickness of metal strip with unit.	4

4. **Motion of a ball rolling down along an angle iron by drawing a graph between 2S and t^2. (Four readings)**

Measuring / marking distance	2
Measuring time = $t^1 + t^2$	4
Plotting graph between 2S & t^2	3
Finding slope / acceleration	3

5. **Value of " g" by free fall method. (Three readings)**

Measuring distance	2
Measuring time + mean time	4
Measuring time period	3
Calculation for value of "g" with unit	3

6. **Coefficient of sliding friction using a horizontal plane. (Three readings)**

Performance & recording observations	8
Measuring μ_s	4

7. **Find force of limiting friction. (Three readings)**

Measuring weight of pan.	2
Measuring weight placed on the pan	3
Measuring total weight / limiting friction.	3
Average value of limiting friction.	4

(Turn Over)

8. **Value of "g" by Atwood machine (Three readings)**

Taking different masses m_1 & m_2	2
Measuring time of fall for m_1	2
Measuring acceleration	3
Measuring 'g'	3
Average value of 'g'	2

9. **Resultant of two forces using horizontal force table. (Two readings)**

Setting up apparatus	2
Measuring weights P Q R	2
Selecting scale and indicating forces with arrowheads.	3
Using head to tail rule to find R'	3
Comparing R & R'	2

10. **Weight of an object by using vector addition of forces. (Two readings)**

Setting up apparatus	2
Measuring forces P Q	3
Selecting scale and indicating forces	3
Using head to tail rule to find R	4

11. **Principle of moments by using meter rule balanced on a wedge. (Three readings)**

Finding centre of gravity	2
Suspending weights and balancing	3
Measuring distances	3
Clockwise moments & anticlockwise moments by using formula	4

12. **Find unknown weight of a body using principle of moments. (Two readings)**

Finding centre of gravity	2
Weight of known and unknown	2
Suspending known and unknown weight and balancing	2
Measuring distances	3
Finding unknown weight	3

13. **Tension in strings by balancing meter rod on stand. (Two readings)**

Finding C.G of the meter rod	1
Find zero correction for spring balances	1
Finding weight of meter rule	1
Setting the apparatus	1
Measuring distances	2
Finding T_1 & T_2	4
Comparing T_1 & T_2 with reading of spring balances	2

14. **Effect of length of a simple pendulum on time period and find 'g' by calculation. (Two readings)**

Measuring diameter of bob and radius	2
Setting two lengths	2
Taking time for two different lengths for 20 vibrations and measuring average time t	3
Find time period T	2
Calculating 'g' using formula	3

(Continued)

15. Effect of mass of pendulum on time period. (Three readings)

Measurement of diameter and finding radius of each mass	3
Measuring length of simple pendulum for each mass	2
Taking time for 20 vibrations twice and finding mean time ' t '	4
Find time period and average time period of simple pendulum	3

16. Effect of amplitude on time period of pendulum (Three readings)

Measuring diameter and radius	2
Measuring length of simple pendulum	2
Taking time for 20 vibrations twice and finding mean time 't'	4
Find time period and average time period of simple pendulum	4

17. Relationship between load and extension (Helical Spring) by drawing a graph. (Four readings)

Apparatus setting	2
Taking four observations	5
Plotting graph	5

18. Density of body heavier than water by Archimedes Principle.

Weighing directly in air	2
Weighing in water	2
Finding decrease in weight of solid object in water	4
Finding density by using formula	4

19. Density of liquid using disposable syringe. (Three readings)

Finding mass of syringe	2
Finding volume of liquid	2
Finding mass of syringe and liquid	2
Finding mass of liquid	2
Finding density using formula	2
Average density with units	2

20. Specific heat by method of mixture using polystyrene cups.

Measuring different masses (i.e. polystyrene cup, water , bob)	3
Measuring different temp. (i.e. initial temp., final temp. etc.)	3
Using law of heat exchange	2
Calculate specific heat	4

21. Graph between temperature and time when ice is converted into water and then to steam by slow heating.

Measuring temperature when ice melts	2
Recording temperature when temperature changes (0 – 100 °C)	3
Measuring temperature when water changes into steam	3
Plotting graph and result	4

22. Find latent heat of fusion.

Measuring mass of calorimeter, water, ice	3
Measuring temp. of water, mixture	3
Finding L_f using formula	6

PART – II

1. **Laws of refraction using a glass slab. (Two readings)**

Marking the boundary of glass slab	2
Drawing incident, refracted, emergent rays with arrows	2
Measuring angles of incidence and refraction	3
Finding refractive index	3
Mean refractive index	2

2. **Refractive index of water using concave mirror. (Two readings)**

Approximate focal length	2
Removing parallax	2
Removing parallax after adding water in mirror	2
Measuring distances	3
Finding refractive index	3

3. **Critical angle of glass using a prism or semi-circular slab and a light may box. (Two readings)**

Setting up of apparatus	4
Performance and geometry	3
Finding critical angle	3
Mean critical angle	2

4. **Path of a ray of light through glass prism and measure angle of deviation. (Two readings)**

Marking the boundary of prism	2
Drawing incident, refracted, emerging rays with arrows	3
Completion geometry	3
Measuring angle of incidence and deviation	4

5. **Focal length of a convex lens by parallax method. (Two readings)**

Approximate focal length	2
Ray diagram	2
Finding p & q	3
Calculate focal length	3
Mean focal length	2

6. **Set up a microscope.**

Ray diagram	2
Finding approximate focal lengths of eye piece and objective	2
Setting up apparatus	3
Removing parallax	2
Adjusting eye piece and getting magnified image	3

7. **Set up a telescope.**

Ray diagram	2
Finding approximate focal length of eye piece and objective	2
Setting up apparatus	3
Removing parallax	2
Adjusting eye piece and getting inverted image	3

8. **Verification of Ohm's law (Using wire as a conductor) (Three readings)**

Circuit diagram	2
Three voltmeter readings	3
Three ammeter readings	3
Finding R	2
Mean R	2

(Continued)

9. **Study resistors in series circuit. (Two readings)**

Circuit diagram	2
Measuring I , V_1 , V_2 , V_3 , V'	2
Finding $V' = V_1 + V_2 + V_3$	2
Comparing V & V'	1
Measuring R_1 , R_2 , R_3	2
Finding $R_e = R_1 + R_2 + R_3$	1
Finding R using formula	1
Comparing R & R'	1

10. **Study resistors in parallel circuit. (Two readings)**

Circuit diagram	2
Measuring V , I_1 , I_2 , I_3 , I'	2
Finding $I = I_1 + I_2 + I_3$	2
Comparing I & I'	1
Finding R_1 , R_2 , R_3	2
Finding R_e	1
Finding R using formula $\left(=\frac{V}{I'}\right)$	1
Comparing R_e & R	1

11. **Resistance of galvanometer by half deflection method. (Three readings)**

Circuit diagram	2
Taking out suitable resistance from HRB to get even no deflection	3
Taking out suitable resistance from LRB to make the deflection half	3
Calculate resistance of galvanometer	3
Mean resistance of galvanometer	1

12. **Trace the magnetic field due to a bar magnet.**

Setting the bar magnet in proper position	2
Drawing boundary of bar magnet	2
Plotting magnetic field	4
Show th lines of force with arrow heads	4

13. **Magnetic field due to a current carrying circular coil.**

Circuit diagram	2
Adjusting coil in N-S direction	2
Plotting lines of force	6
Draw arrows	2

14. **Verification of truth table OR, AND, NOT, NOR and NAND gates.**

Circuit diagram	3
Performance	3
Truth table	6

Special Note :

(i) PARTIAL MARKING IS MUST FOR EACH EXPERIMENT
(For example experiment No.1) **2 + 2 + 4 + 4**

(ii) Indicate clearly the marks awarded to candidate on the front page of answer book as :

Q1	Q2	N.B	V.V	TOTAL